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# Associations Between School Meals and Dietary Intake on Weekdays and Weekend Days

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## Abstract

This study used one weekday and one weekend day of dietary recall data for 2,376 school children in NHANES (2003-2008) to address two related objectives: (1) to estimate relationships between school meals participation and weekday dietary intake, controlling for weekend dietary intake as a proxy for food preferences and health beliefs; and (2) to estimate the prevalence of low energy intake and low dietary quality on the weekend, and investigate their associations with household resources and school meals participation. The analysis provided no evidence that a lack of school meals on the weekend adversely affects dietary intake among school children. Low energy intake and low dietary quality were equally prevalent on weekdays and weekend days, and both were unrelated to measures of household resources and school meals participation. We also found that school meals participants and non-participants had equivalent energy intake and overall dietary quality. Low-income children who participated in both SBP and NSLP had significantly higher overall quality, and for grains, meat and beans; while participants from higher income families had significantly lower scores for grains and saturated fat.

**Keywords:** school meals; food insecurity; weekend; children; energy intake; dietary quality; HEI-2005; NHANES

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## **Summary**

The relationship between participation in the National School Lunch Program (NSLP) or the School Breakfast Program (SBP) and weekday dietary intake is unclear. In 2012, more than 31 million children participated in the NSLP on an average day, and 68% of those children received their lunch for free or at a reduced cost. Almost all children who eat an SBP breakfast also regularly eat an NSLP lunch. Furthermore, the absence of school meals on the weekend might adversely affect children's weekend eating and have implications for their health.

### ***What Is the Issue?***

Prior research has shown positive associations between participation in school meals and some dietary measures but these results may have been biased by food preferences and health beliefs, which can influence both participation in school meals and food selection. We assessed relationships between school meals participation and weekday dietary intake, controlling for weekend eating as a proxy for children's food preferences and health beliefs. For example, children who do not drink milk or who prefer fried foods would do so regardless of the day of the week. Similarly, we also estimated the prevalence of low energy intake and low diet quality on weekend days controlling for weekday eating, and examined the associations between low intake on weekends and household financial and food resources.

### ***What Did the Study Find?***

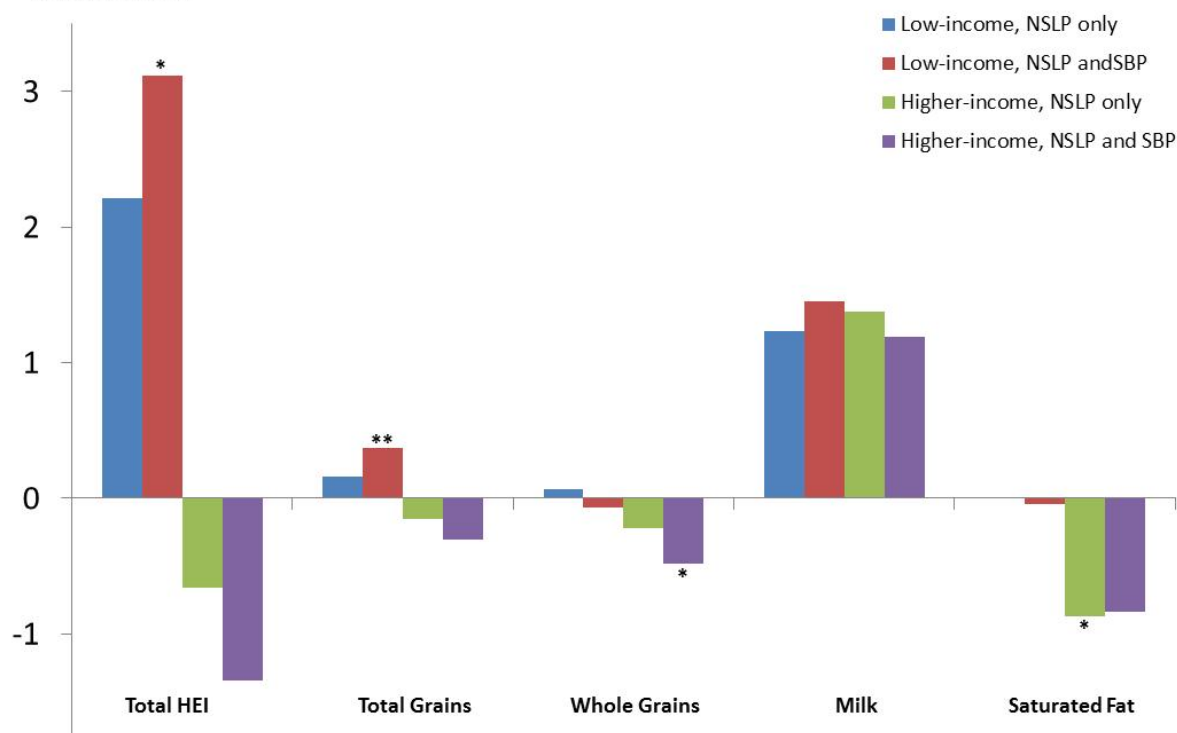
***Participants in NSLP and SBP scored better for milk and vegetables, and worse for whole grains, saturated fat and sodium when compared to children who ate no school meals.***

Overall, school meals participants and non-participants had equivalent energy intake relative to need and total HEI score after adjustment for weekend eating. However, participants had better average HEI scores for milk and vegetables than non-participants and worse scores for whole grains, saturated fat and sodium after adjustment for weekend eating. All other dietary components were equivalent for school meals participants and non-participants.

***Low-income children who participated in school meals had better weekday dietary quality*** (see chart below).

Low-income children who participated in NSLP and SBP had significantly better scores for total HEI than low-income children who did not participate, as well as a better average score for total grains. The relationship between participation in NSLP and SBP and dietary quality was less favorable for children from higher income families; Higher income participants in NSLP and SBP had significantly worse scores for total grains and whole grains, and participants in NSLP only had a worse average score for saturated fat. Other HEI component scores were equivalent for participants and non-participants of both income groups.

Adjusted differences in breakfast/lunch HEI component scores for school meals participants relative to non-participants, by family income



Values are linear regression coefficient estimates relative to no school meals within family income group adjusted for dietary intake on the weekend, grade level, race/ethnicity, obese body weight, and sedentary activity level.

Significant coefficients for interactions between participation and family income group are denoted: \*\*  $P < 0.01$  and \*  $P < 0.05$ .

Source: Hanson KL, Olson CM. School Meals Participation and Weekday Dietary Quality Were Associated after Controlling for Weekend Eating among US School Children Aged 6 to 17 Years. *J Nutr.* 2013; 143:714-721.

### ***Dietary recall data did not suggest that an absence of school meals adversely affects children's dietary intake on the weekend.***

The frequency of low energy intake relative to need was equivalent on weekdays and weekend days (13.6 and 14.9%), as was low total HEI (16.9 and 21.4%). Further, none of the eight measures of household financial and food resources were consistently related to low energy intake or low total HEI on weekdays or on weekend days.

### ***How Was the Study Conducted?***

This analysis utilized dietary recall data from the 2003-2008 National Health and Nutrition Examination Survey (NHANES). The sample included children aged 6-17

years with reliable dietary recalls for one weekday and one weekend day (n=2,376). Multivariate linear regression models examined weekday-weekend differences in energy intake as a percentage of estimated energy requirement, and weekday-weekend differences in Healthy Eating Index-2005 (HEI) scores computed for breakfast and lunch only. HEI component scores included dietary densities per 1,000 calories for total fruit, whole fruit, total vegetables, dark green and orange vegetables and legumes, total grains, whole grains, milk, meat and beans, oils, saturated fat, sodium, calories from solid fats, alcohol and added sugars, and a total score of all components. Higher HEI scores indicate better dietary quality. Models also included intake on the other recall day, grade level, body weight category, level of physical activity, ethnicity and an indicator of whether the second recall day was on the weekend.

Low energy intake was defined as at least one age- and sex-specific standard deviation below estimated requirement, and low diet quality was defined as at least one standard deviation below the overall mean total HEI score (for the entire day). Indicators of household financial and food resources included family income below 185% of the federal poverty level; household food insecurity, receipt of SNAP benefits, and use of emergency food resources; and the child's usual participation in NSLP and SBP, meal payment level, and frequency of NSLP lunches and SBP breakfasts eaten. We used these data to estimate the prevalence of low energy intake and low diet quality on weekdays and on weekend days, and to examine the associations between weekend dietary intake and household financial and food resources controlling for the variables listed above.

**References**

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